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DATA ON THE RADIOSENSITIVITY OF CERTAIN
AGRICULTURAL PLANTS

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- USSR -

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AGRICULTURAL PLANTS

/ Following is the translation of an article
by S. A. Valeva in Biofizika (Biophysics),
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A summary table of the radiosensitivity of the seeds of various agricultural plants has been compiled in the laboratory of radiation genetics of the Institute of Biophysics of the Academy of Sciences USSR. The summary includes both literature data, in addition to yet unpublished data obtained by the co-workers of the laboratory, as well as data of other scientific institutions.

The present summary has had as its goal the facilitating of the selection of radiation doses, chiefly for work pertaining to the selection of plants.

As criterion of sensitivity, the so-called "critical dose" * was taken, i.e., the dose in the presence of which an appreciable depression of the development of the plants is observed, but which nevertheless leaves a sufficient quantity of plants (30-20%) capable of yielding seeds at the end of vegetation. The doses are given in roentgens. For some plants the critical dose has still not been exactly elucidated, and there are only approximate data available. Thus, the greater than (>) and the less than (<) signs signify that the critical dose is greater or less than that indicated, but close to it; the much greater than (>>) sign signifies that the critical dose is much greater than that indicated.

* A term introduced for the first time by Gustafsson.

Sensitivity of Agricultural Plants to Gamma-
and X-ray Radiations

<u>Agricultural plant, variety</u>	<u>Form on which the radiation acts</u>	<u>Critical dose in rads</u>	<u>Author</u>
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
Clinelimus / Klinelimus /	Dry seeds	< 5000	Sorokina
Timothy (Phleum)	The same	< 10,000	"
Regneria	"	< 5000	"
Corn / Zea mays /			
Dnepropetrovsk	"	10,000	Preobra- zhenskaya
Krasnodar hybrid	"	10,000	Valeva
Kuban Liming	"	10,000	"
VIR 42 / VIR=All-Union Institute of Plant-Grow- ing /	"	10,000	"
Voronezh 76	"	10,000	"
Podmoskovskaya / Near Moscow /	"	10,000	"
Nemchinov	"	12,000-	"
		15,000	
Hybrids with Nemchinov	"	12,000-	"
		15,000	
Lenin Hills No. 1	"	15,000	Orav
Rye (Secale)	"	10,000-	Gustafs-
		15,000	son
Vyatka	"	20,000	Valeva
Kentucky bluegrass (Poa pratensis)	"	15,000-	Gustafs-
		20,000	son
Digraphis arundinacea	"	16,000	Khertssh /Hirsch/
	Germinated seeds	8,000	"
Hordeum distichum	Dry seeds	20,000-	Preobra- zhenskaya
	Pollen in the period of ripening	25,000	Lutkov
	Germinated seeds	2,000	
		2,500-	
Oats (avena)	Dry seeds	12,000	"
Victory	The same	25,000	Preobra- zhenskaya

<u>Agricultural plant, variety</u> 1	Form on which Critical the radiation dose in			Author 4
	<u>acts</u> 2	<u>r</u> 3		
Oats (avena) Nemchinov	Dry seeds	30,000	Sorokina	
Panic gasses (Panicum) Krasnoufimsk	"	>25,000	Preobra- zhenskaya	
Wheat (Triticum monococcum)	"	<15,000	Gustafs- son	
Wheat (Triticum dicoccum)	"	>15,000	"	
Wheat (Triticum durum) Akmolinka / Akmolinsk	"	15,000	Sorokina	
Wheat (Triticum vulgare) Mil'turum	"	5,000	Preobra- zhenskaya	
Severnaya (Northern)	"	>> 5,000	"	
Vetvistaya (branched)	"	> 5,000	"	
Lyutestsns (Lutescens)	"	~15,000	Orav	
Moscow 'Moskovka')	"	<20,000	Valeva	
Diamant	"	~15,000	Priylinn	
Kauka	"	15,000	"	
Motsinava	"	15,000	Grdzeli- shvili	
Tsikho 1	"	15,000	"	
Kakhi 8	"	15,000	"	
Eritrospermum 143 (Erythro- spermum 143)	"	15,000	"	
Sudinskaya	"	20,000	Kobylyan- skaya	
Hybrid 1429	"	20,000	"	
Hybrid 186	"	> 20,000	Valeva	
Hybrid 1	"	> 20,000	"	
Hybrid 99	"	20,000	"	
Hybrid 557	"	20,000	"	
Ul'yanobka	"	20,000	"	
Meadow foxtail (Alopecurus pratensis)	"	25,000		
Rye grass	"	40,000	Sorokina	
Sorghum				
Kaforskoye	"	>30,000	Nikolayeva	
Maylo	"	>30,000	"	
Feterita	"	>30,000	"	
Dzhugari	"	>30,000	"	
Pea (Pisum)	"	5,000- 15,000	Gustafs- son	

<u>Agricultural plant, variety</u> 1	Form on which Critical the radiation dose in			<u>Author</u> 4
	<u>acts</u> 2	<u>r</u> 3		
Pea (Pisum)	Buds with hardly colored "wings"	2,000	Lutkov	
Zhegalov	Dry seeds	5,000	Turkov	
Victoria Strube (Viktoriya Shtrube)	The same	5,000	Preobrazhenskaya	
Sakharnyy (Sugar)	"	5,000	"	
Rose victoria (Viktoriya rozovaya)	"	> 5,000	"	
Shtambovyy	"	> 5,000	"	
Capital (Kapital)	"	15,000	"	
Moscow (Moskovskiy)	"	< 10,000	Valeva, Turkov	
Nemchinov	"	10,000	"	
Raynyay	"	15,000	"	
Pisum arvense				
Small seed (Melkosemyannaya)	"	~ 50,000	"	
Broad bean (Vicia faba)	"	7,000	"	
Bean (Phaseolus)				
VIR variety	"	< 8,000 (near Lenin- grad)	Makasheva	
The same	"	> 8,000 (in the Ukraine)	"	
Bean (Phaseolus)				
Robust (Robust)	"	< 10,000	Valeva	
Tyulchafze	"	< 10,000	"	
Chokhatau	"	10,000	"	
1019	"	10,000	"	
1020	"	10,000	"	
Izumrudnaya	"	10,000	"	
Saint Andrew (Svyatoy Andrey)	"	> 10,000	"	
Red seam (Krasnyy rubchik)	"	> 10,000	"	
Latvia dry grain	"	> 10,000	"	
White Moscow (Moskovskaya belaya)	"	25,000	Preobrazhenskaya	
Severnaya (Northern)	"	25,000	"	
Phaseolus aureus				
4730	"	30,000	Turkov	
Soy bean (Glycine)	"	7,500	"	
Kuban 276	"	~ 12,000	Mityukevich	

<u>Agricultural plant, variety</u>	1	Form on which the radiation acts	Critical dose in rads		<u>Author</u>
			2	3	
Soy bean (Glycine)					
Kuban 4958		Dry seeds	20,000	Mityukevich	
Hybrid 29		The same	20,000	Soldatova	
Vigna 292		"	12,000	Turkov	
Lathyrus sativus Steppe		"	20,000	Preobrazhenskaya	
Lentil (Lens)					
1900		"	12,000	Turkov	
Dnepropetrovsk		"	20,000	Preobrazhenskaya	
Lupinus luteus (fodder)		"	20,000	Priylinn	
Annual Lupinus (alkaloidal)		"	60,000	Valeva	
Vicia 31		"	10,000	Valeva	
L'gov		"	25,000	Preobrazhenskaya	
Arachis "		"	25,000	"	
"		"	20,000	Gregory (Gregori)	
Chick-pea (Cicer arietinum)		"			
1168		"	25,000	Valeva	
Lotus corniculatus (Bird's-foot trefoil)		"	80,000	"	
Lucerne (Medicago) (alfalfa)		"	100,000	Preobrazhenskaya	
Clover		"	100,000	"	
Melilotus		"	100,000	"	
Onion Strigunov		"	<10,000	Turkov	
Lettuce					
Bettner's		"	10,000	"	
Sugar beet		"	10,000	Berezina	
Cotton		"	50,000	Gyul'akhimedov	
"		Pollen	2,000	Osborn	
Perilla		Dry seeds	15,000-20,000	Preobrazhenskaya	
Tomatoes					
Pushkin		The same	20,000	Turkov	
Harvest (Urozhaynyy)		"	20,000	"	

<u>Agricultural plant, variety</u> 1	Form on which Critical the radiation dose in			<u>Author</u> 4
	<u>acts</u> 2	<u>r</u> 3		
Potato	Tubers	5,000		Rubin
"	The same	5,000- 10,000		Nyubom
Sunflower	Dry seeds	7,000		Gustafsson
Melon				
Kolkhoznitsa (Collective farm)"		>20,000		Soldatova
Spinach				
Fatty leaf (Zhirnolistnyy)	"	25,000		Preobra- zinskaya "
Dill	"	30,000		
Buckwheat				
Bolshevik 2k	"	20,000		Sakharov and others
Bolshevik 4k	"	40,000		"
Cannabis sativa				
Krasnodar	"	30,000		Marko- vich
"	Germinated seeds	8,000- 10,000		Lutkov
Cucumbers				
Podmoskovnyye (Near Moscow)	Dry seeds	50,000		Preobra- zhenskaya
Vyazniki				
Nicotiana (Makhorka)	The same	~50,000		Turkov
"	"	>50,000		Preobra- zhenskaya
Nicotiana (Makhorka)	Pollen	14,000- 17,000		Lutkov
Castor Oil Plant (Ricinus)				
Novo-Kubanskaya	Dry seeds	>50,000		Preobra- zhenskaya
Sesamum indicum (Sesame)	"	>50,000		"
Camelina	"	50,000		"
Brassicus napus var. napifera	"	35,000		Gustafsson
Cauliflower	"	80,000		Turkov
Heads of cabbage	"	>100,000		Gustafsson
Late Moscow	"	>80,000		Turkov
Carrot	"	80,000		"
Rice	"	>75,000		Bora
Brassica juncea	"	100,000		Turkov

<u>Agricultural plant, variety</u> 1	Form on which Critical the radiation dose in			<u>Author</u> 4
	<u>acts</u> 2	<u>r</u> 3		
Sinapis alba (White mustard)	Dry seeds	>100,000		Gustafsson
Rape (Brassica napus var. oleifera) Nosovskiy	The same	100,000		Preobra- zhenskaya
Radish (Horse radish, Raphaeus sativus var. major) Winter (Zimnyaya)	"	>100,000	"	
Indian mallow (Abutilon Theophrasti) OSS	"	100,000	"	
Lathyrus iberica	"	100,000	"	
Flax (Linum) Sunrise (Voskhod)	"	>100,000	Turkov	
"	"	200,000	Preobra- zhenskaya	
Radish (Raphaeus sativus var. minor) Rubin	"	>100,000	Turkov	
Sachs' (Saks')	"	>200,000	Preobra- zhenskaya	
Garlic (Allium sativum)	Bulbs	100	Gyul'akh- medov	
Strawberry (Fragaria) "	Dry seeds	20,000	Mochalova	
lemons	Tendrils	150	"	
Citrus plants { oranges	Pollen	8,000	Sakharu- lidze	
grapefruit	Dry seeds	~ 2,000	"	
Black currant (Ribes nigrum)	Grafts	3,000	Bauer	
Stone-fruit plants	Resting buds	2,500- 4,000	Grankhal'	
Apple trees	The same	5,000- 7,500	"	
Pomegranate	Dry seeds	~10,000	Radzhabli	
Quince (Cydonia oblonga)	The same	~10,000	"	
Grape	Vines	7,500	Breyder	
Grape	Dry Seeds	~10,000	Radzhabli	
Woody species	Buds in the resting state	12,000	Trudova	

<u>Agricultural plant, variety</u>	Form on which Critical the radiation dose in			<u>Author</u>
	<u>acts</u>	<u>r</u>	<u>4</u>	
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	
Woody species	Buds in the period of summer ripening	1,500	Trudova	
Pine (<i>Pinus silvestris</i>)	Dry seeds	>900	Gustafsson	
Fir	The same	>900	"	
Alder (<i>Alnus</i>)	"	>10,000	"	
Mulberry tree 2p	"	<10,000	Radzhabli	
" 4p	"	20,000	"	
Spiraea	"	30,000	Soldatova	
Tulip	Bulb	600	Lusdrekht	
Cyclamen	The same	10,000	Reykhardt	
Phlox Drummondii	Dry seeds	<5,000	Priylinn	
Defiance				
Petunia hybrids	The same	<5,000	"	
Comanche	"	<5,000	"	
Delphinium hibridum	"	<5,000	"	
Callistephus chynensis	"	5,000	"	
Markt				
Chrysanthemum ondicum	"	7,000	Yank	
Carthamus tinctorius	"	7,000	Gustafsson	
Lathyrus odoratus				
3999	"	10,000	Priylinn	
Antirrhinum majus				
Scharlach triumph	"	<10,000	"	
Calendula officinalis	"	<15,000	"	
Gladiolus gandavensis	Bulbs	>15,000	"	
Dianthus caryophyllus	Dry seeds	>15,000	"	
Aquilegia hybrids	The same	>15,000	"	
Papaver somniferum	"	~15,000	Gustafsson	
Polygonum lapathifolium	"	16,000	Utekhin	
Mathiola incana				
Teicheri Rubin	"	15,000	Priylinn	
Dresden varieties	"	25,000	Shcherbakov	
Elscholtzia	"	20,000	Kolomiyets	
Datura tatula	"	20,000	Shteyniger	

<u>Agricultural plant, variety</u> <u>1</u>	Form on which Critical the radiation dose in			<u>Author</u> <u>4</u>
	<u>acts</u> <u>2</u>	<u>r</u> <u>3</u>		
Datura stramonium	Dry seeds	20,000	Shtey-niger	
Phacelia cetifolia	The same	>50,000	Khvostova	
Stellaria media	"	64,000	Utekhin	
Amaranthus retroflexus	"	>>64,000	"	

#1503

END